

IN THE CLAIMS:

1 1. (ORIGINAL) A file server system for a computer having a processor, a memory cou-
2 pled to the processor, and a system bus to which the processor and memory are coupled,
3 the computer being configured to implement a file system, the file server system compris-
4 ing:

5 (A) a storage operating system adapted to be executed by the processor;

6 (B) a removable nonvolatile memory device coupled to the system bus, the
7 removable nonvolatile memory device containing diagnostics code for the system; and

8 (C) a set of boot instructions resident in the file server system including in-
9 structions for executing a normal boot routine upon a power-on of the system, and includ-
10 ing instructions enabling the processor to identify the removable nonvolatile memory de-
11 vice and to load the diagnostics code into the memory in response to a command to exe-
12 cute a diagnostics boot routine instead of the normal boot routine.

1 2. (ORIGINAL) The system as defined in claim 1 wherein the removable nonvolatile
2 memory device is a compact flash, the compact flash being divided into a plurality of par-
3 titions with the diagnostics code residing in at least one of the partitions.

1 3. (ORIGINAL) The system as defined in claim 2 wherein one of the partitions of the
2 compact flash is designated as a maintenance log into which test results and data are
3 stored.

1 4. (ORIGINAL) The system as defined in claim 2 further comprising:

2 (A) a input/output device coupled to the system bus, and which input/output
3 device is identifiable by the processor; and

4 (B) a second bus coupled between the input/output device and the compact
5 flash in such a manner that when the processor identifies the input/output device, the
6 compact flash is, in turn, initialized and the diagnostics code is executed upon a com-
7 mand to run a diagnostics boot routine.

1 5. (ORIGINAL) The system of claim 1 further comprising:

2 (A) a storage adapter coupled to the system bus; and
3 at least one storage disk coupled to the storage adapter and containing files served by the
4 operating system.

1 6. (CURRENTLY AMENDED) A file server system for a computer having a proces-
2 sor, a memory coupled to the processor, and a system bus to which the processor and
3 memory are coupled, the computer being configured to implement a file system, the file
4 server system comprising:

5 (A) a storage operating system adapted to be executed by the processor;

6 (B) a removable nonvolatile memory device coupled to the system bus, the
7 removable nonvolatile memory device containing diagnostics code for the system;

8 (C) a set of boot instructions resident in the filer server system including in-
9 structions for executing a normal boot routine upon a power-on of the system, and includ-
10 ing instructions enabling the processor to identify the removable nonvolatile memory de-
11 vice and to load the diagnostics code into the memory in response to a command to exe-
12 cute a diagnostics boot routine instead of the normal boot routine;

13 (D) a storage adapter coupled to the system bus;

14 (E) at least one storage disk coupled to the storage adapter and containing files
15 served by the operating system; and

16 (E F) a plurality of storage disks coupled to the storage adapter and data on the
17 disks being stored in a write anywhere file layout system.

1 7. (ORIGINAL) The system as defined in claim 1 further comprising a motherboard
2 upon which the processor, the memory and the set of boot instructions reside.

1 8. (ORIGINAL) The system as defined in claim 7 wherein the removable nonvolatile
2 memory device containing the diagnostics code is resident external to the motherboard,
3 and the diagnostics code on the removable nonvolatile memory device is adapted to be
4 upgraded or amended free of taking the system out of service.

1 9. (PREVIOUSLY PRESENTED) The system as defined in claim 1 wherein said diag-
2 nostic code includes code relating to the diagnostics of hardware devices including the

3 processor, the memory, the buses, the adapters, the disks, a compact flash and interfaces
4 thereof.

1 10. (ORIGINAL) The system as defined in claim 1 wherein said boot instructions reside
2 in firmware.

1 11. (ORIGINAL) A method of performing diagnostics in a filer server system, the filer
2 server system having a processor, a memory coupled to the processor and having memory
3 locations addressable by the processor, a storage operating system adapted to be executed
4 by the processor, system firmware containing instructions for power-on self tests, a set of
5 boot instructions including instructions for executing a normal boot routine upon a
6 power-on of the system after the power-on self test is completed, the method comprising
7 the steps of:

8 (A) providing a removable nonvolatile memory device interfaced with the moth-
9 erboard, the removable nonvolatile memory device being identifiable to the processor;

10 (B) dividing the removable nonvolatile memory device into separate memory par-
11 titions;

12 (C) storing a set of diagnostics instructions, being a diagnostics code, in one of the
13 partitions of the removable nonvolatile memory device; and

14 (D) programming the system firmware to recognize a user implemented command
15 for a diagnostics boot such that in response to the diagnostics boot command, the firm-

16 ware loads the diagnostics code residing in the removable nonvolatile memory device
17 into the memory to execute a diagnostic boot routine instead of a normal boot routine.

1 12. (ORIGINAL) The method as defined in claim 11 including the further step of
2 (E) maintaining, in a separate partition of the removable nonvolatile memory
3 device, a maintenance log into which diagnostic test results data and data about the stor-
4 age system are stored.

1 13. (ORIGINAL) The method as defined in claim 11 including the further step of:
2 selecting as the removable nonvolatile memory device, a compact flash.

1 14. (ORIGINAL) The method as defined in claims 11 including the further step of:
2 selecting as the removable nonvolatile memory device a personal computer (PC)
3 card.

1 15. (ORIGINAL) The method as defined in claim 11 including the further step of:
2 upgrading the diagnostics code without taking the file server out of service.

1 16. (ORIGINAL) A storage system for a computer configured to implement a file sys-
2 tem, the storage system having a processor, a memory coupled to the processor and hav-
3 ing memory locations addressable by the processor, a system bus to which the memory
4 and the processor are coupled, an operating system adapted to be executed by the proces-

5 sor, system firmware containing instructions for power-on self tests and a set of instruc-
6 tions for executing a normal boot routine upon a power-on of the system after a power-on
7 self test is completed, the storage system comprising:

8 (A) means for storing a set of diagnostics instructions comprising diagnostics
9 code, in a removable nonvolatile memory device coupled to the system bus, the remov-
10 able nonvolatile memory device being identifiable to the system; and

11 (B) means for executing the diagnostics code in response to a diagnostics boot
12 command received by system firmware.

1 17. (ORIGINAL) The storage system of claim 16 further comprising:

2 means for coupling the removable nonvolatile memory device to the processor in
3 such a manner that the diagnostics code may be upgraded without taking the storage sys-
4 tem out of normal service.

1 18. (ORIGINAL) The storage system of claim 17, further comprising:

2 means for upgrading the diagnostics code by interfacing with the storage system
3 through an associated input/output interface.

1 19. (ORIGINAL) computer-readable medium operating on a computer in a network that
2 includes one or more storage systems sharing volumes, the computer-readable medium
3 including program instructions for performing the steps of:

4 (A) initiating a power-on self test when the computer is powered-on;

- 5 (B) identifying devices present in the computer;
- 6 (C) in response to a successful power-on self test, commencing a normal boot
7 routine;
- 8 (D) recognizing a command for a diagnostics boot;
- 9 (E) in response to the diagnostics boot command, probing devices to locate a
10 removable nonvolatile memory device containing diagnostic boot instructions; and
- 11 (F) interrupting the normal boot routine and executing the diagnostics code for
12 a diagnostics boot for the computer.

1 20. (ORIGINAL) The computer readable medium as defined in claim 19 including the
2 further instruction to identify a compact flash as the removable nonvolatile memory de-
3 vice in which diagnostics code for the computer is stored.

1 21. (ORIGINAL) The computer readable medium as defined in claim 20 including fur-
2 ther instructions to save diagnostics test results and other data in a predetermined address
3 location in the compact flash associated with the computer.

1 22. (ORIGINAL) The computer readable medium as defined in claim 21 wherein the
2 diagnostics boot command is initiated by a human maintenance operator.

1 23. (ORIGINAL) The computer readable medium as defined in claim 21 wherein the
2 diagnostics boot command is initiated as an instruction in the computer readable medium
3 upon the occurrence of a predetermined event.

1 24. (ORIGINAL) A diagnostic system for use with a storage system comprising:
2 a removable nonvolatile memory device interconnected with the storage system,
3 wherein the removable nonvolatile memory device containing boot diagnostic code that
4 is loadable into the storage system as an alternative to a normal boot routine.

1 25. (ORIGINAL) The diagnostic system of claim 24, wherein the removable nonvolatile
2 memory device further comprises a plurality of partitions.

1 26. (ORIGINAL) The diagnostics system of claim 25, wherein the boot diagnostic code
2 is contained within a first partition of the plurality of partitions.

1 27. (ORIGINAL) The diagnostic system of claim 26, wherein the removable nonvolatile
2 memory device further comprises a second partition, the second partition storing a diag-
3 nostic log.

1 28. (ORIGINAL) The diagnostic system of claim 24, wherein the removable nonvolatile
2 memory device is a PC card.

1 29. (ORIGINAL) The diagnostic system of claim 24, wherein the removable nonvolatile
2 memory device is a compact flash.

1 30. (ORIGINAL) The diagnostic system of claim 24, wherein the storage system further
2 comprises a firmware boot routine, the firmware boot routine having a process for select-
3 ing between execution of either a normal boot routing or a diagnostic boot routine.

1 31. (ORIGINAL) A file server system for a computer having a processor, a memory
2 coupled to the processor, and a system bus to which the processor and memory are cou-
3 pled, the computer being configured to implement a file system, the file server system
4 comprising:

5 (A) a storage operating system adapted to be executed by the processor;

6 (B) a removable nonvolatile memory device coupled to the system bus, the
7 removable nonvolatile memory device containing diagnostics code for the system, the
8 removable nonvolatile memory device also divided into a plurality of partitions with the
9 diagnostics code residing in at least one of the partitions; and

10 (C) a set of boot instructions resident in the filer server system including in-
11 structions for executing a normal boot routine upon a power-on of the system, and includ-
12 ing instructions enabling the processor to identify the removable nonvolatile memory de-
13 vice and to load the diagnostics code into the memory in response to a command to exe-
14 cute a diagnostics boot routine instead of the normal boot routine.

1 32. (ORIGINAL) The system of claim 29 wherein one of the partitions is designated as a
2 maintenance log into which test results and data are stored.

1 33. (ORIGINAL) The system of claim 29 further comprising:
2 a separate storage medium, the separate storage medium storing a boot routine.

1 34. (PREVIOUSLY PRESENTED) The system of claim 33, wherein the separate stor-
2 age medium is a partition on the removable nonvolatile memory device.